CLAIMS

WHAT IS CLAIMED IS:

1. An imaging device comprising:

a plurality of photosensors arranged in matrix on a light-receiving surface of the imaging device, for generating photo signals in accordance with an amount of received light; and

a readout section for adding up the generated photo signals in each of pixel blocks for external output, the pixel blocks being set on the light-receiving surface, and wherein

each of the pixel blocks is constituted of N ($N \geqq 2$) photosensors in an array direction of the matrix, and the pixel blocks in an even number array and the pixel blocks in an odd number array are shifted in phase by half a phase in the array direction.

2. The imaging device according to claim 1, wherein:

said readout section comprises: transfer gates for transferring the photo signals from said photosensors; vertical paths through which the generated photo signals transferred via said transfer gates are vertically transported in the array direction; and a horizontal path through which the photo signals transported and outputted from the vertical paths are horizontally transported; and

the transfer gates in the even number array and the transfer gates in the odd number array are shifted in position from each other to eliminate the half phase shift of the pixel blocks to align the pixel blocks in a same phase on said vertical paths.

3. The imaging device according to claim 1, wherein:

said readout section comprises: vertical paths through which the generated photo signals are vertically transported in the array direction; and a horizontal path through which the photo signals transported and outputted from said vertical paths are horizontally transported; and

said vertical paths have vertical segments, and the numbers of vertical segments in the even number array and in the odd number array are made different so as to eliminate the half phase shift of the pixel blocks and align the pixel blocks in a same phase on said horizontal path.

4. The imaging device according to claim 1, wherein:

said readout section comprises: polyphase transport electrodes; vertical paths through which the generated photo signals are vertically transported in the array direction by transport pulses applied to the polyphase transport electrodes; and a horizontal path through which the photo signals transported and outputted from said vertical paths are horizontally transported; and

a wiring pattern of said transport electrodes in the odd number array and a wiring pattern of said transport electrodes in the even number array are shifted so as to eliminate the half phase shift of the pixel blocks and align the pixel blocks in a same phase on said vertical paths.

5. The imaging device according to claim 4, wherein

at least one of said transport electrodes is formed in such a pattern as to connect the photosensors in the odd number array and the photosensors in the even number array with their phases shifting from each other by half a phase in a unit of the pixel block.

6. The imaging device according to claim 2, wherein

said readout section adds up the photo signals in each of the pixel blocks on at least either of said vertical paths and said horizontal path.

7. The imaging device according to claim 3, wherein

said readout section adds up the photo signals in each of the pixel blocks on at least either of said vertical paths and said horizontal path.

8. The imaging device according to claim 4, wherein

said readout section adds up the photo signals in each of the pixel blocks on at least either of said vertical paths and said horizontal path.

9. The imaging device according to claim 1, wherein:

said readout section comprises vertical paths through which the generated photo signals are vertically transported; and a horizontal path through which the photo signals transported and outputted from said vertical paths are horizontally transported; and

the shift direction of the pixel blocks is a direction substantially perpendicular to a transport direction of said vertical paths, the shift direction being the array direction.

10. The imaging device according to claim 9, wherein

said readout section adds up the photo signals in each of the pixel blocks on said horizontal path or at an output of said horizontal path.

11. The imaging device according to claim 1, further comprising

a color filter array disposed on the light-receiving surface such that the photosensors in each pixel block have a same color.

12. The imaging device according to claim 11, wherein said color filter array has:

a first color arranged on every pixel block in one of the even number array and the odd number array of the matrix; and

a second color and a third color arranged alternately on the pixel blocks in the other of the even number array and the odd number array.

13. The imaging device according to claim 1, further comprising

an optical low pass filter for blurring an optical image projected on the light-receiving surface in a direction substantially perpendicular to the array direction of the matrix.

14. The imaging device according to claim 1, wherein

said readout section selectively has a high-resolution transport mode in which the

photo signals are transported in each of said photosensors.

15. An imaging device comprising:

a plurality of photosensors arranged in matrix diagonally to horizontal and vertical directions on a light-receiving surface, for generating photo signals in accordance with an amount of received light; and

a readout section for adding up the generated photo signals in each pixel block set on the light-receiving surface for external output, wherein

each of the pixel blocks is constituted of N ($N \geqq 2$) photosensors in an array direction of the matrix.

16. The imaging device according to claim 15, further comprising

a color filter array disposed on the light-receiving surface such that the photosensors in each pixel block have a same color.

17. The imaging device according to claim 16, wherein

said color filter array has:

a first color arranged on every pixel block in one of the even number array and the odd number array of the matrix; and

a second color and a third color arranged alternately on the pixel blocks in the other of the even number array and the odd number array.

18. The imaging device according to claim 15, further comprising

an optical low pass filter for blurring an optical image projected on the light-receiving surface in a direction substantially perpendicular to the array direction of the matrix.

19. The imaging device according to claim 15, wherein

said readout section selectively has a high-resolution transport mode in which the photo signals are transported in each of said photosensors.

20. An imaging device comprising:

a plurality of photosensors two-dimensionally arranged on a light-receiving surface, for generating photo signals in accordance with an amount of received light; and

a readout section reading out the generated photo signals, wherein

said readout section selectively has a grid imaging mode in which the generated photo signals on the light-receiving surface are sampled in a grid pattern for readout, and a diagonal grid imaging mode in which the generated photo signals on the light-receiving surface are sampled in a diagonal grid pattern for readout.

21. The imaging device according to claim 20, wherein:

said plurality of photosensors are arranged in a grid pattern on the light-receiving surface; and

in the diagonal grid imaging mode said readout section adds up the photo signals for readout in each area around a crosspoint of the diagonal grid pattern.

22. The imaging device according to claim 21, further comprising

an optical low pass filter disposed on the light-receiving surface, for blurring an optical image in a direction substantially perpendicular to an adding-up direction of the photo signals.

23. The imaging device according to claim 21, further comprising

a color filter array disposed on the light-receiving surface such that the photosensors in each unit of the adding-up substantially have a same color.

24. The imaging device according to claim 21, further comprising

a color filter array disposed on the light-receiving surface such that the photosensors in each unit of the adding-up have different colors from each other.

25. The imaging device according to claim 20, wherein:

said plurality of photosensors are arranged in a diagonal grid pattern on the

light-receiving surface; and

in the grid imaging mode said readout section adds up the photo signals in each area around a crosspoint of the grid pattern for readout.

26. The imaging device according to claim 25, further comprising

an optical low pass filter disposed on the light-receiving surface, for blurring an optical image in a direction substantially perpendicular to an adding-up direction of the photo signals.

27. The imaging device according to claim 25, further comprising

a color filter array disposed on the light-receiving surface such that the photosensors in each unit of the adding-up substantially have a same color.

28. The imaging device according to claim 25, further comprising

a color filter array disposed on the light-receiving surface such that the photosensors in each unit of the adding-up have different colors from each other.

29. The imaging device according to claim 1, further comprising

an image processing section for applying interpolation to outputs read out in the diagonal grid imaging mode to generate image data having a grid pixel pattern.

30. An imaging device according to claim 1, wherein:

said readout section comprises: a plurality of vertical CCDs provided between arrays of said plurality of photosensors in a vertical direction on the light-receiving surface, for vertically transporting the photo signals outputted from said photosensors; first horizontal transport parts provided at one ends of said vertical CCDs, for horizontally transporting the photo signals outputted from the one ends; and second horizontal transport parts provided at the other ends of said vertical CCDs, for horizontally transporting the photo signals outputted from the other ends;

said vertical CCDs have two transport electrodes for each of said photosensors, and

every two pairs of the two transport electrodes for the photosensors have electrically crosswise connection to each other, the photosensors being adjacent to each other in a horizontal direction.

31. An imaging device comprising:

a plurality of photosensors two-dimensionally arranged on a light-receiving surface, for generating photo signals in accordance with an amount of received light;

a plurality of vertical CCDs provided between arrays of said plurality of photosensors in a vertical direction on the light-receiving surface, for vertically transporting the photo signals outputted from said photosensors;

first horizontal transport parts provided at one ends of said vertical CCDs, for horizontally transporting the photo signals outputted from the one ends; and

second horizontal transport parts provided at the other ends of said vertical CCDs, for horizontally transporting the photo signals outputted from the other ends, wherein

said vertical CCDs have two transport electrodes for each of said photosensors, and every two pairs of the two transport electrodes for the photosensors have electrically crosswise connection to each other, the photosensors being adjacent to each other in a horizontal direction.